

# Practice of River Restoration in Iowa



IOWA RIVERS & WATERWAYS  
STUDY COMMITTEE

Mimi Wagner Landscape Architecture LLC

Small Iowa company  
providing  
comprehensive river &  
stormwater  
management services



- Firm in 4<sup>th</sup> year of business
- Licensed Professional
- Targeted Small Business
- Disadvantaged Business Enterprise
- Networked with affiliated professionals to provide comprehensive services

# River-Related Practice for 20+ years

- USDA-NRCS State Water Resources Planning Staff  
9 years
- Engineering/ Architecture consulting practice 6 years
- Teaching & Research in Watershed Assessment, Water Quality, Stream Restoration, Soils 15 years
- Graduate studies at UC-Berkeley in fluvial geomorphology & river restoration
- Stream Restoration & Environmental Planning Consulting for the past 4 years

Thinking  
about how  
to solve  
river  
problems  
has been  
reframed  
in a  
fundamental  
way

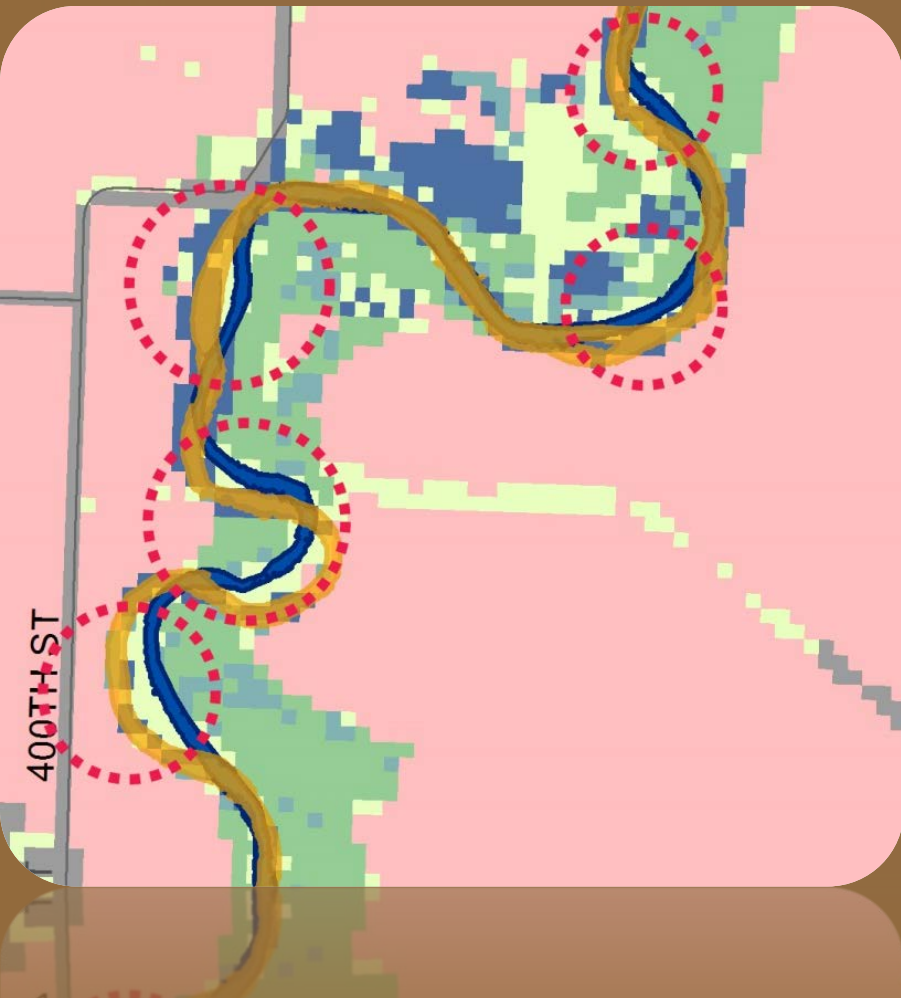


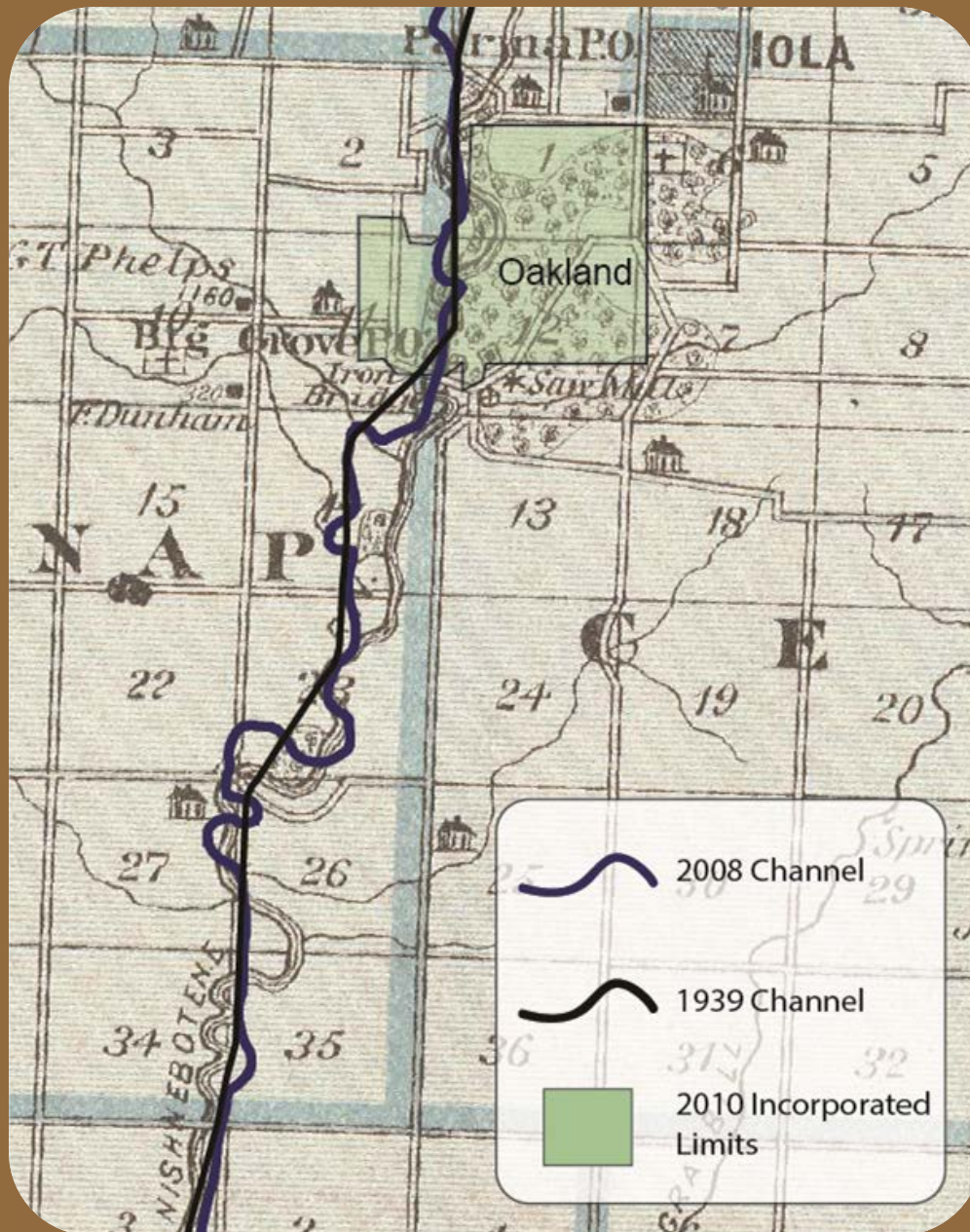






# West Nishnabotna River, Pottawattamie County





West Nishnabotna  
River in  
Pottawattamie  
County is 2.3 miles  
longer today than it  
was in 1980

# Understanding the underlying problem in order to design an efficient solution

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- **Stream assessment protocols** for my municipal and land trust clients
- Quantitative analysis
- Small built projects making a difference on **urban streams**
- Research on vegetative aspects of **bioengineering**



# Goal: Develop resilient and self-sustaining natural systems

- Identify the cause of the degraded conditions
- Integrate how the project economics and infrastructure
- Stream Assessment to understand and quantify

# Stream Assessment Protocol

## Channel Condition:

- Qualitative assessment of in-stream habitat
- Average bankfull width
- Channel substrate
- Canopy cover %
- Livestock access
- Average bank height (by sides)
- Bank material
- Stream Channel Debris/Blockages
- Depositional patterns

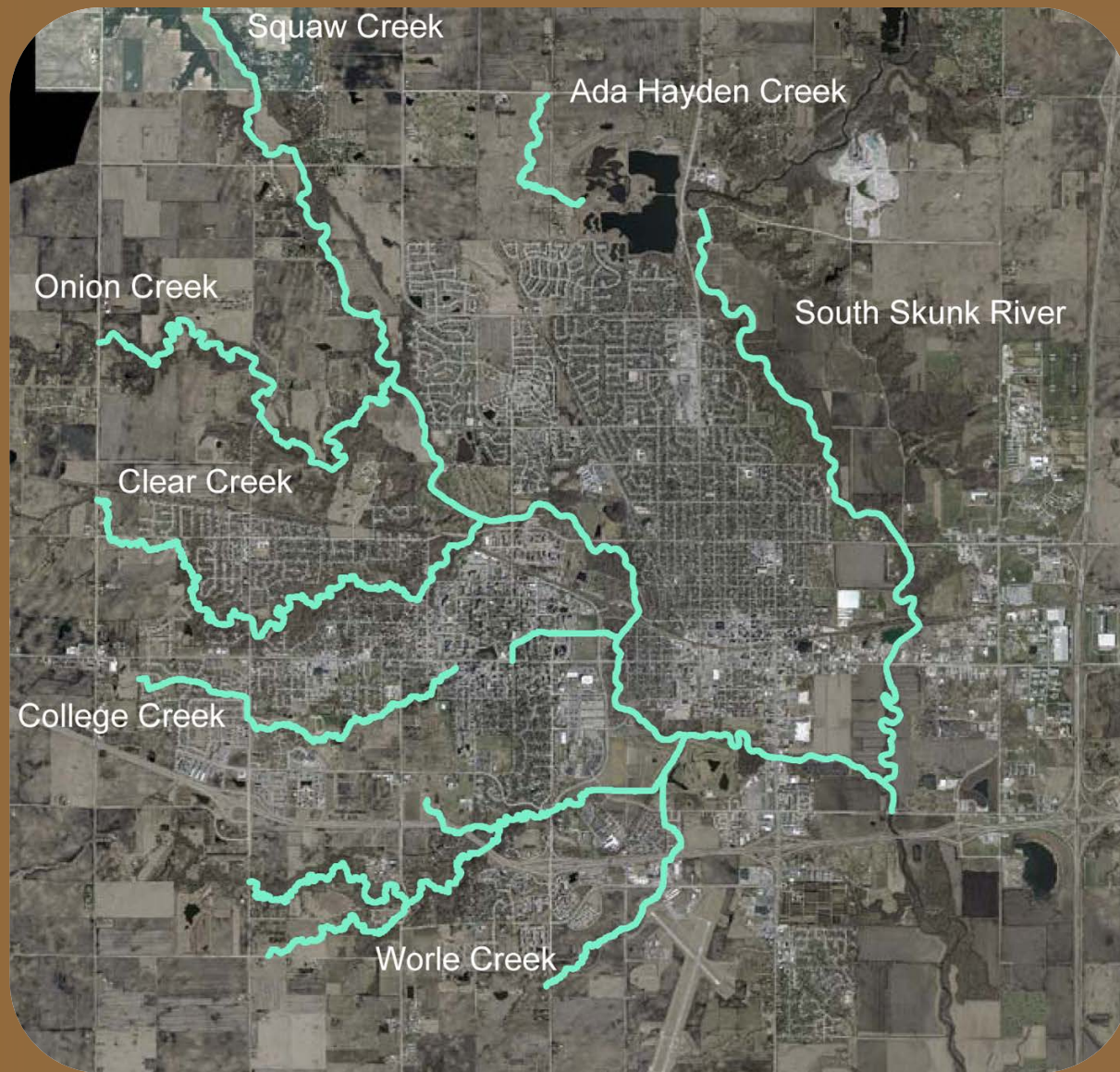


# Streambank erosion:

- Eroding bank location & side of river
- Eroding bank length
- Eroding bank height
- Bankfull width
- Bankfull height
- Bank angle
- Root depth
- Root density
- Surface protection
- Slump block presence
- USDA NRCS erosion rating

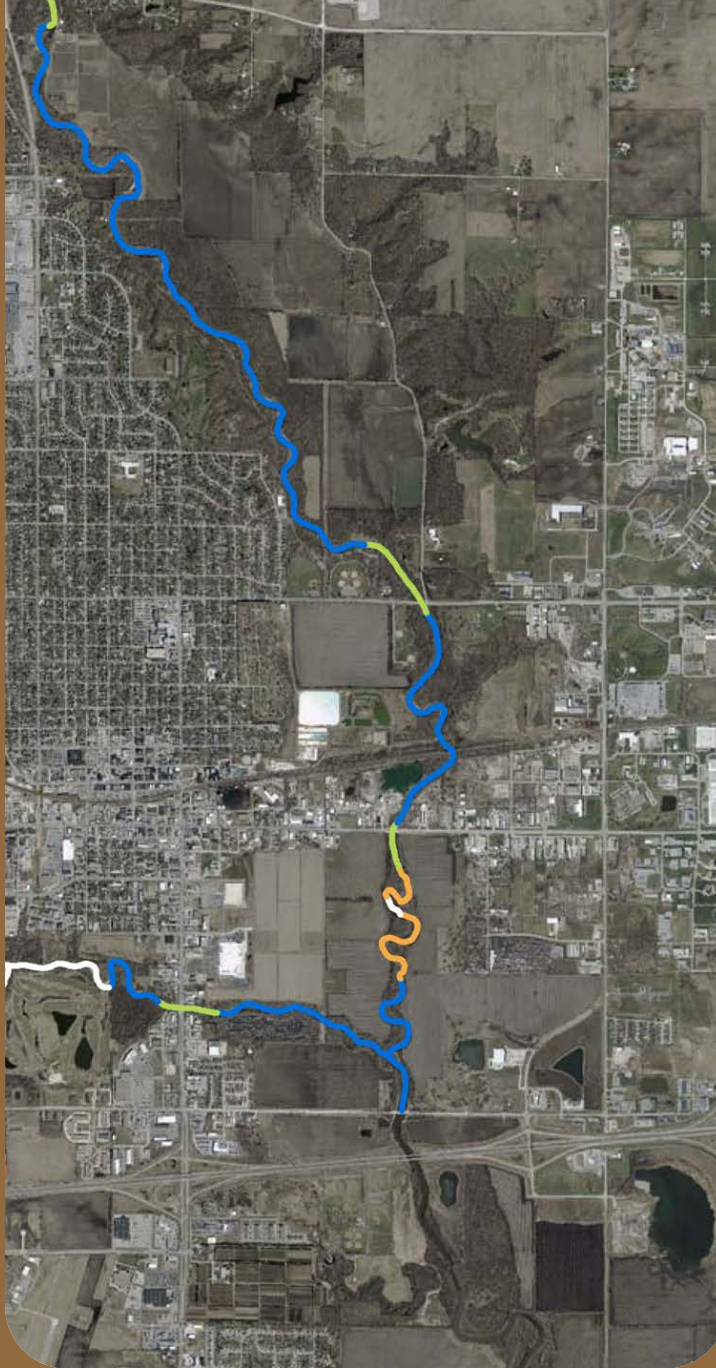






## 2011 City of Ames Stream Assessment

Comprehensive Assessment of 41 miles of river



## Example Results: South Skunk River

Sediment Delivery  
Estimate: 7060 tons/year

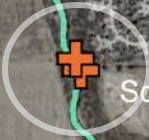
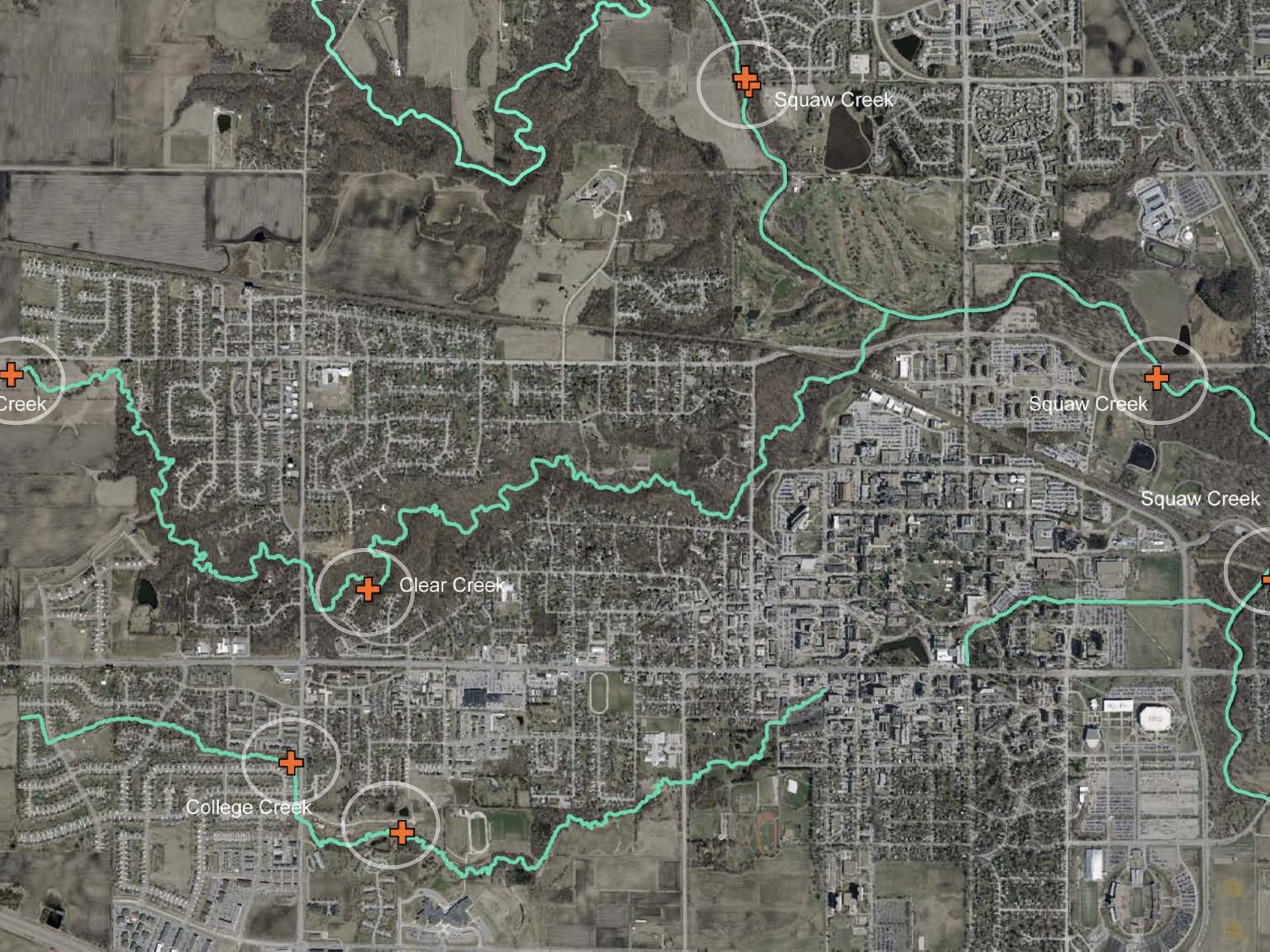


An aerial photograph of a rural landscape. A winding red line, representing the sediment delivery estimate, runs from the top center towards the bottom right, ending near a large, dark, irregularly shaped pond. The landscape includes agricultural fields, some buildings, and a residential area with houses and roads in the bottom left corner. A white line is visible near the bottom right, possibly a road or boundary.

## Example Results: Ada Hayden Tributary

Sediment Delivery Estimate:  
1000 tons/year





Squaw Creek



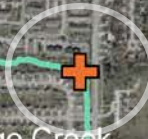
Creek



Squaw Creek



Clear Creek



College Creek

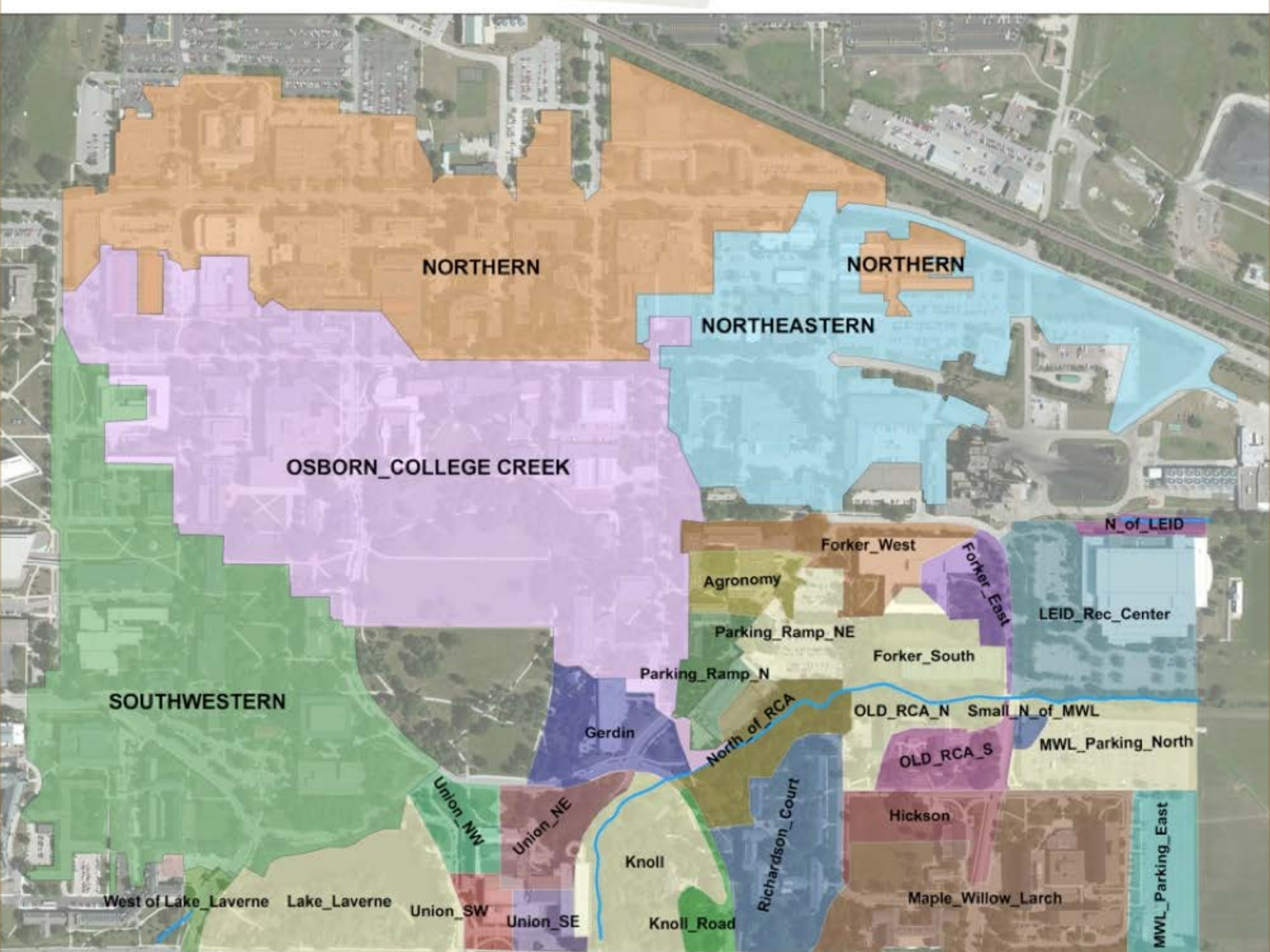




Stream bank pins to  
measure actual bank  
recession for situations  
where the rate of recession  
(and urgency) is in question







NORTHERN

NORTHERN

NORTHEASTERN

OSBORN\_COLLEGE CREEK

N\_of\_LEID

Forker\_West

Forker\_East

Agronomy

LEID\_Rec\_Center

Parking\_Ramp\_NE

Forker\_South

Parking\_Ramp\_N

SOUTHWESTERN

OLD\_RCA\_N Small\_N\_of\_MWL

MWL\_Parking\_North

Gerdin

North\_of\_RCA

OLD\_RCA\_S

Union\_NW

Union\_NE

Richardson\_Court

Hickson

Knoll

Maple\_Willow\_Larch

West\_of\_Lake\_Laverne Lake\_Laverne

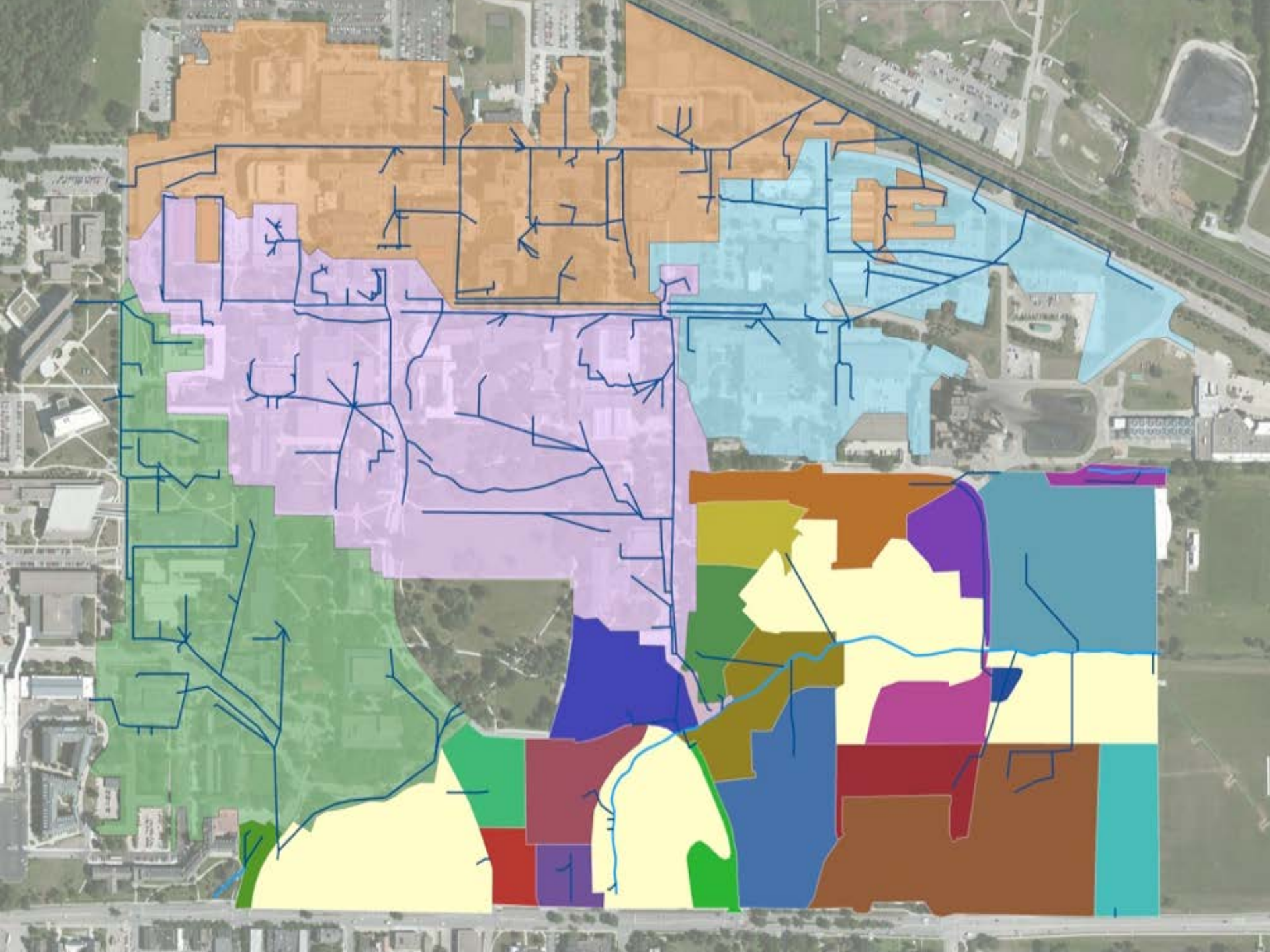
Union\_SW

Union\_SE

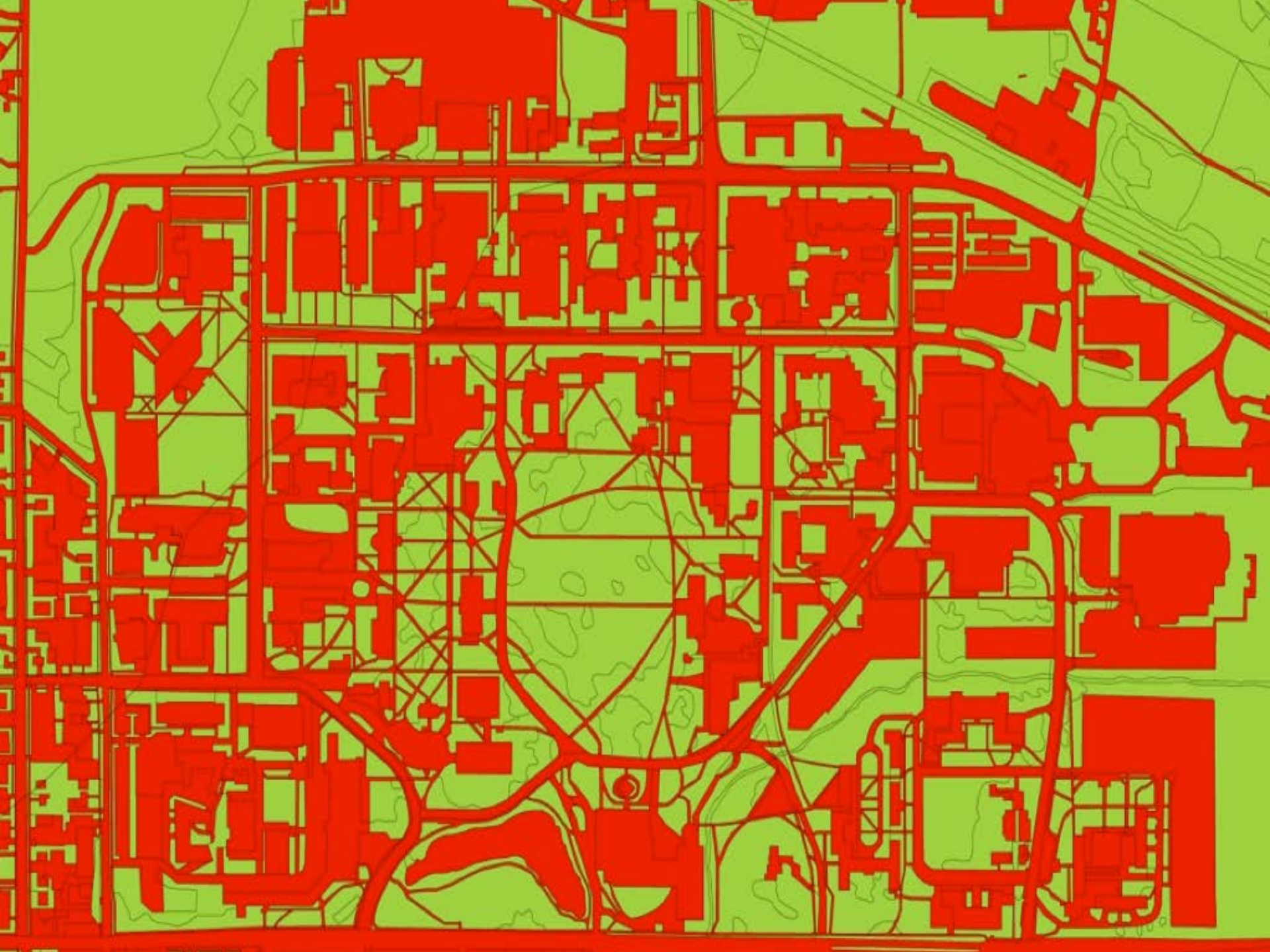
Knoll\_Road

MWL\_Parking\_East







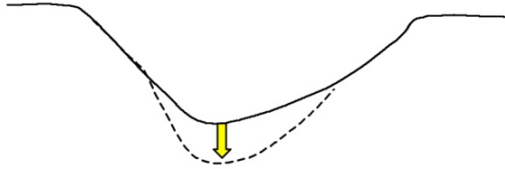




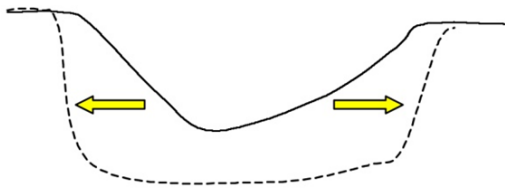




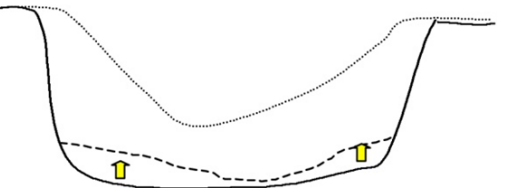
Stage 1 - Stable



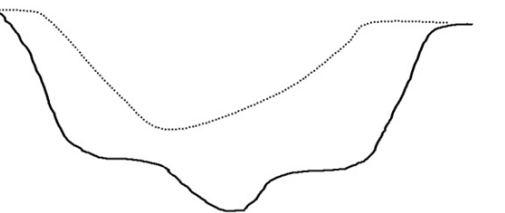
Stage 2 - Bed Lowering



Stage 3 - Widening



Stage 4 - Deposition



Stage 5 - Restabilization

- College Creek is considered an “incised” stream
- The banks on both sides are vertical
- A new, functional floodplain is forming in the bottom
- The former floodplain has been abandoned except in major storm events





























# Woody Vegetation Tolerance to Channel Shear Stress

